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Report on East Lake Tohopekaliga, Oscelola County, Florida

National Eutrophication Survey, Corvallis, Oreg

Prepared for

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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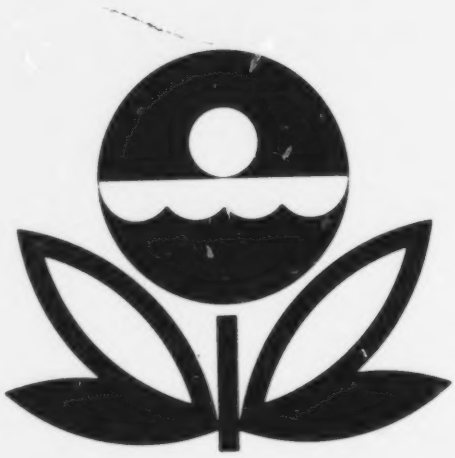

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REPORT

ON

EAST LAKE TOHOPEKALIGA

OSCEOLA COUNTY

FLORIDA

EPA REGION IV

WORKING PAPER No. 249

WITH THE COOPERATION OF THE

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

AND THE

FLORIDA NATIONAL GUARD

NOVEMBER, 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by FPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Florida Department of Environmental Regulation for professional involvement and to the Florida National Guard for conducting the tributary sampling phase of the Survey.

Joseph W. Landers, Jr., Secretary of the Department of Environmental Regulation; John A Redmond, former Director of the Division of Planning, Technical Assistance, and Grants; and Dr. Tim S. Stuart, Chief of the Bureau of Water Quality, provided invaluable lake documentation and counsel during the survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

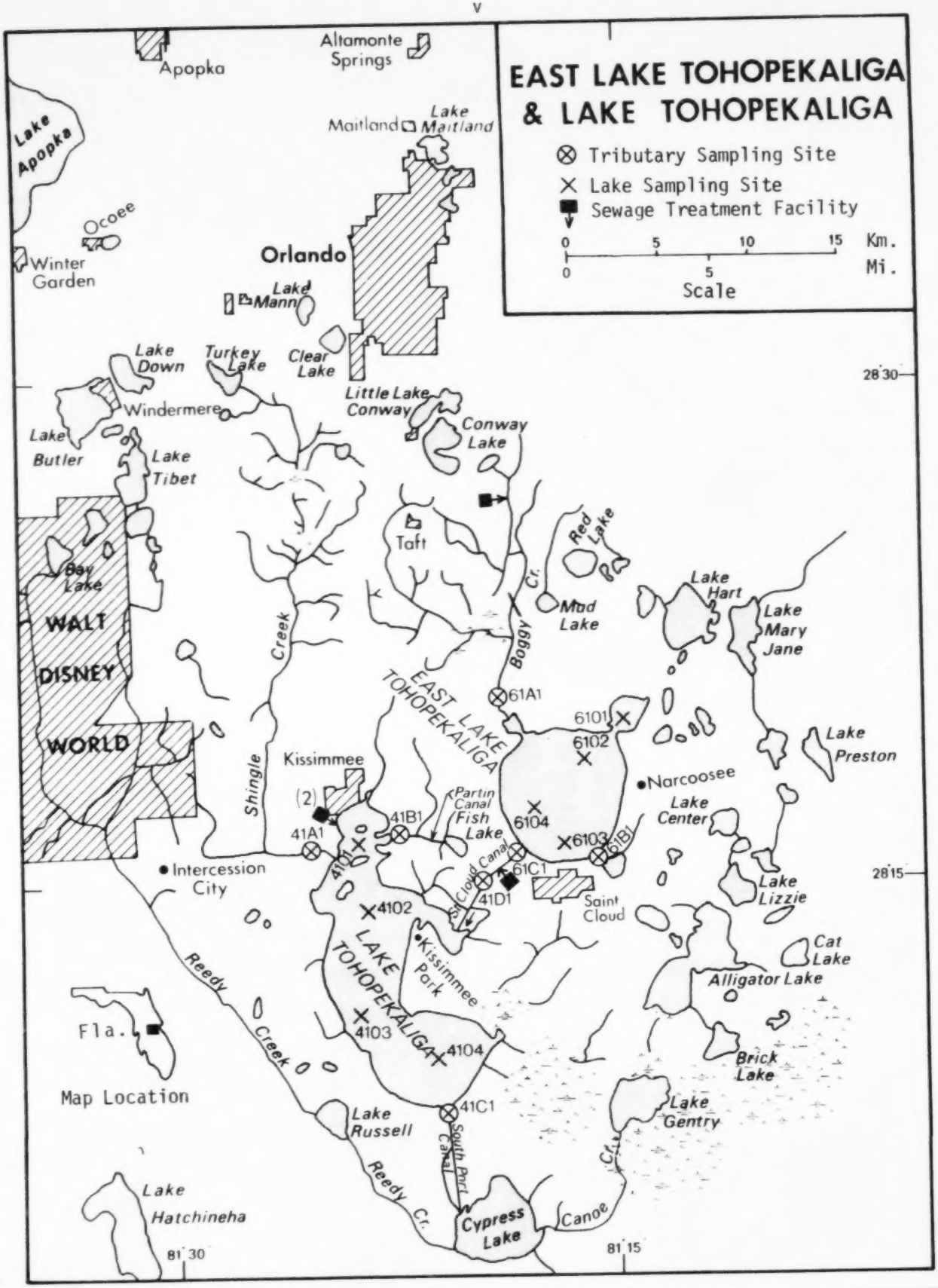
Major General Henry W. McMillan (Retired), then the Adjutant General of Florida, and Project Officer Colonel Hugo F. Windham, who directed the volunteer efforts of the Florida National Guard, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF FLORIDA

LAKE NAME	COUNTY
Alligator	Columbia
Apopka	Lake, Orange
Banana	Polk
Crescent	Flagler, Putnam
Doctors	Clay
Dora	Lake
East Tohopekaliga	Osceola
Effie	Polk
Eloise	Polk
George	Putnam, Volusia
Gibson	Polk
Glenada	Highlands
Griffin	Lake
Haines	Polk
Hancock	Polk
Horseshoe	Seminole
Howell	Orange, Seminole
Istokpoga	Highlands
Jessie	Polk
Jessup	Seminole
Kissimmee	Osceola
Lawne	Orange
Lulu	Polk
Marion	Polk
Minnehaha	Orange
Minneola	Lake
Monroe	Seminole, Volusia
Munson	Leon
Okeechobee	Glades, Hendry, Martin, Okeechobee, Palm Beach
Poinsett	Brevard, Orange, Osceola
Reedy	Polk
Seminole	Jackson, FL; Decatur, Seminole, GA
Seminole	Pinellas
South	Brevard
Talquin	Gadsden, Leon
Tarpon	Pinellas
Thonotosassa	Hillsborough
Tohopekaliga	Osceola
Trout	Lake
Weohyakapka	Polk
Yale	Lake


EAST LAKE TOHOPEKALIGA
& LAKE TOHOPEKALIGA
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
0 5 10 15 Km.
0 5 Mi.
Scale
Apopka
Altamonte Springs
Lake Apopka
Maitland
Lake Maitland
Ocoee
Winter Garden
Orlando
Lake Mann
Lake Down
Turkey Lake
Clear Lake
Little Lake Conway
Conway Lake
Windermere
Lake Butler
Lake Tibet
Bay Lake
WALT DISNEY WORLD
Taft
Red Lake
Mud Lake
Boggy Cr.
Lake Hart
Lake Mary Jane
Lake Preston
Shingle Creek
EAST LAKE TOHOPEKALIGA
61A1
6101
6102
Kissimmee
(2)
41A1
41B1
Partin Canal
Fish Lake
6104
6103
61B1
Narcoosee
Lake Center
Intercession City
4101
4102
St Cloud Canal
61C1
41D1
Saint Cloud
Lake Lizzie
Kissimmee Park
Cat Lake
Alligator Lake
Reedy Creek
LAKE TOHOPEKALIGA
4103
4104
Fla.
Map Location
Brick Lake
Lake Gentry
41C1
Lake Russell
South Port Canal
Cr.
Reedy Cr.
Lake Hatchineha
Cypress Lake
Canoe
28 30
28 15
81 30
81 15

EAST LAKE TOHOPEKALIGA

STORET NO. 1261

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that East Lake Tohopekaliga is mesotrophic. It ranked second in overall trophic quality when the 41 Florida lakes sampled in 1973 were compared using a combination of six parameters*. Eight of the lakes had less median total phosphorus, none of the other lakes had less but one had the same median dissolved phosphorus, none nad less but two had the same median inorganic nitrogen, one had less mean chlorophyll a, and three had greater mean Secchi disc transparency.

Survey limnologists reported extensive growths of rooted aquatic plants.

B. Rate-Limiting Nutrient:

The results of the algal assay indicate East Lake Tohopekaliga was phosphorus limited at the time the sample was collected (03/13/73). The lake data indicate phosphorus limitation in March but nitrogen limitation in September and November.

C. Nutrient Controllability:

1. Point sources--Including septic tanks, point sources

* See Appendix A.

contributed an estimated 14.0% of the total phosphorus and 2.5% of the total nitrogen inputs to East Lake Tohopekaliga during the Survey sampling year. The McCoy Air Force Base accounted for 11.9% of the phosphorus load; the Orlando Jetport, 2.1%; and the estimated septic tank input amounted to less than 1% of the total load.

The sampling year phosphorus loading of 0.72 g/m^2 is 1.8 times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading. However, after the Survey sampling was completed, the number of Air Force Base personnel was sharply reduced; and at this time, only a maintenance group remains (Dye, 1977). The change in point-source phosphorus loading resulting from the personnel reduction is not known, but Survey data indicate that even complete removal of all point-source inputs would still leave a loading of 0.62 $g/m^2/yr$ or nearly 1.6 times Vollenweider's eutrophic loading. While Florida lakes may be able to assimilate phosphorus at a higher level than that suggested by Vollenweider (Shannon and Brezonik, 1972), it is questionable whether an appreciable improvement in the trophic condition of the lake would result from point-source phosphorus control unless other sources can be controlled as well (see discussion below).

2. Non-point sources--The estimated contributions of non-point sources accounted for 86.0% of the total phosphorus and 97.5% of the total nitrogen inputs to the lake during the sampling year. Boggy Creek contributed 33.5% of the phosphorus load and 16.4% of the nitrogen load, and the estimated ungaged minor tributary and immedi-

ate drainage contributions accounted for 45.2% of the phosphorus and 71.4% of the nitrogen inputs.

According to the Orange County Department of Pollution Control (as cited by Federico and Brezonik, 1975), dairy farms and cattle ranches are major contributors of nutrients to Boggy Creek. The controllability of nutrients from these sources is not known, but Survey data indicate a reduction of such phosphorus inputs to Boggy Creek would be necessary, in addition to point-source control, for a significant improvement in the trophic condition of East Lake Tohopekaliga.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†:

A. Morphometry††

1. Surface area: 49.30 kilometers^2.
2. Mean depth: 2.7 meters.
3. Maximum depth: 4.5 meters.
4. Volume: 133.110 x 10^6 m^3.
5. Mean hydraulic retention time: 247 days

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Boggy Creek	230.0	1.65
Unnamed Creek B-1	13.4	0.12
Minor tributaries & immediate drainage -	505.0	4.46
Totals	748.4	6.23**

2. Outlet -

St. Cloud Canal	797.7***	6.23

C. Precipitation****:

1. Year of sampling: 122.9 centimeters.
2. Mean annual: 134.1 centimeters.

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† Table of metric conversions--Appendix B.
†† Surface area from FL Game & Fresh Water Fish Comm. (Anonymous, 1971); depths estimated from soundings reported in Appendix D.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Sum of inflows adjusted to equal gaged outflow.
*** Includes area of lake.
**** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

East Lake Tohopekaliga was sampled three times in 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the lake and from one or more depths at each station (see map, page v). During each visit, a single depth-integrated (near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 1.5 meters at station 1, 4.0 meters at station 2, 2.4 meters at station 3, and 3.0 meters at station 4.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR EAST LAKE TOHOPEKALIGA
STORET CODE 1261

PARAMETER	1ST SAMPLING (3/13/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (9/ 6/73) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (11/ 7/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	22.2 - 25.4	24.1	24.0	28.4 - 29.4	28.8	28.7	22.3 - 23.1	22.7	22.6
DISS OXY (MG/L)	6.2 - 8.6	8.1	8.3	5.6 - 7.0	6.5	6.6	7.0 - 7.8	7.5	7.5
CNDCTVY (MCROMO)	120. - 135.	128.	129.	116. - 126.	123.	124.	105. - 116.	112.	113.
PH (STAND UNITS)	6.4 - 7.4	6.9	6.9	6.0 - 6.7	6.4	6.4	6.3 - 6.8	6.6	6.6
TOT ALK (MG/L)	10. - 10.	10.	10.	14. - 18.	16.	15.	10. - 10.	10.	10.
TOT P (MG/L)	0.012 - 0.033	0.021	0.018	0.025 - 0.081	0.052	0.047	0.042 - 0.057	0.047	0.046
ORTHO P (MG/L)	0.003 - 0.007	0.004	0.004	0.013 - 0.074	0.033	0.026	0.006 - 0.012	0.009	0.008
NO2+NO3 (MG/L)	0.020 - 0.060	0.033	0.030	0.040 - 0.060	0.050	0.050	0.020 - 0.100	0.037	0.030
AMMONIA (MG/L)	0.040 - 0.080	0.047	0.040	0.040 - 0.060	0.052	0.050	0.030 - 0.070	0.046	0.040
KJEL N (MG/L)	0.400 - 1.400	0.603	0.530	0.900 - 1.600	1.183	1.150	0.900 - 2.000	1.110	0.950
INORG N (MG/L)	0.060 - 0.140	0.080	0.070	0.080 - 0.120	0.102	0.100	0.050 - 0.170	0.083	0.070
TOTAL N (MG/L)	0.420 - 1.480	0.683	0.530	0.940 - 1.660	1.233	1.200	0.920 - 2.050	1.147	0.980
CHLRPYL A (UG/L)	3.2 - 4.4	3.8	3.8	4.7 - 7.1	6.2	6.4	5.0 - 5.9	5.5	5.6
SECCHI (METERS)	0.8 - 2.4	2.0	2.4	0.8 - 1.9	1.5	1.7	0.5 - 1.2	1.0	1.0

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal units per ml
03/13/73	1. Flagellates	191
	2. Aphanizomenon sp.	169
	3. Oscillatoria sp.	122
	4. Melosira sp.	81
	5. Ankistrodesmus (?) sp.	75
	Other genera	216
	Total	854
09/06/73	1. Lyngbya sp.	1,671
	2. Dactylococcopsis sp.	1,373
	3. Flagellates	955
	4. Merismopedia sp.	537
	5. Chroococcus sp.	477
	Other genera	2,640
	Total	7,653
11/07/73	1. Melosira sp.	1,311
	2. Flagellates	1,079
	3. Cyclotella sp.	745
	4. Lyngbya sp.	694
	5. Dactylococcopsis sp.	347
	Other genera	2,383
	Total	6,559

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/13/73	1	4.1
	2	4.4
	3	3.5
	4	3.2
09/06/73	1	6.9
	2	6.0
	3	7.1
	4	4.7

Sampling Date	Station Number	Chlorophyll a (µg/l)
11/07/73	1	5.4
	2	5.0
	3	5.9
	4	5.8

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.010	0.300	0.1
0.050 P	0.060	0.300	6.3
0.050 P + 1.0 N	0.060	1.300	15.3
1.0 N	0.010	1.300	0.1

2. Filtered and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.006	0.258	0.2
0.050 P	0.056	0.258	6.4
0.050 P + 1.0 N	0.056	1.258	13.6
1.0 N	0.006	1.258	0.2

3. Discussion -

The control yields of the assay algal, Selenastrum capricornutum, indicate that the potential primary productivity of East Lake Tohopekaliga was low at the time the sample was collected (03/13/73). The yield response to the addition of phosphorus and the lack of increase in yield when nitrogen alone was added indicate limitation by phosphorus.

The lake data indicate phosphorus limitation in March

but nitrogen limitation in September and November. Following is a tabulation of the mean inorganic nitrogen/orthophosphorus ratios for each of the sampling stations and times with the indicated limiting nutrient in parentheses.

Station	03/03/73	09/06/73	11/07/73
1	21/1 (P)	5/1 (N)	12/1 (N)
2	18/1 (P)	4/1 (N)	8/1 (N)
3	23/1 (P)	2/1 (N)	9/1 (N)
4	21/1 (P)	5/1 (N)	8/1 (N)

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Florida National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v). Sampling was begun in March, 1973, and was completed in February, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Florida District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the nutrient loads, in $kg/km^2/yr$, at station B-1 and multiplying by the ZZ area in km^2.

The operator of the McCoy Air Force Base wastewater treatment plant provided monthly effluent samples and corresponding flow data. However, the operator of the Orlando Jetport plant did not participate in the Survey; nutrient loads attributed to this source are based on Orange County Department of Pollution Control data reported by Federico and Brezonik (1975).

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* See Working Paper No. 175.

A. Waste Sources:

1. Known domestic* -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
McCoy Air Force Base	4,000	trickling filter	1,902.6	Boggy Creek
Orlando Jetport	varies	pkg. plant	varies	Boggy Creek

2. Known industrial - None

* Dye, 1977.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Boggy Creek	11,960	33.5
Unnamed Creek B-1	430	1.2
b. Minor tributaries & immediate drainage (non-point load) -	16,160	45.2
c. Known domestic STP's -		
McCoy Air Force Base	4,245	11.9
Orlando Jetport*	735	2.1
d. Septic tanks** -	30	<0.1
e. Known industrial - None	-	-
f. Direct precipitation*** -	2,170	6.1
Total	35,730	100.0

2. Outputs -

Lake outlet - St. Cloud Canal 5,025

3. Net annual P accumulation - 30,705 kg.

* Federico and Brezonik, 1975.
** Estimate based on 100 shoreline dwellings; see Working Paper No. 175.
*** Brezonik and Shannon, 1971.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Boggy Creek	59,595	16.4
Unnamed Creek B-1	6,885	1.9
b. Minor tributaries & immediate drainage (non-point load) -	259,570	71.4
c. Known domestic STP's -		
McCoy Air Force Base	7,160	2.0
Orlando Jetport*	780	0.2
d. Septic tanks** -	1,065	0.3
e. Known industrial - None	-	-
f. Direct precipitation*** -	28,595	7.8
Total	363,650	100.0

2. Outputs -

Lake outlet - St. Cloud Canal 228,820

3. Net annual N accumulation - 134,830 kg.

* Federico and Brezonik, 1975.
** Estimate based on 100 shoreline dwellings; see Working Paper No. 175.
*** Brezonik and Shannon, 1971.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Boggy Creek	52	259
Unnamed Creek B-1	32	514

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Note, however, that Florida lakes may be able to assimilate phosphorus at a somewhat higher level than that suggested by Vollenweider (Shannon and Brezonik, 1972).

Essentially, Vollenweider's "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	0.72	0.62	7.4	2.7

Vollenweider phosphorus loadings (g/m^2/yr) based on estimated mean depth and hydraulic retention time of East Lake Tohopekaliga:

"Dangerous" (eutrophic loading)	0.40
"Permissible" (oligotrophic loading)	0.20

V. LITERATURE REVIEWED

Anonymous, 1971. Federal Aid in Fish Restoration, Dingell-Johnson Proj. No. F-21-5, 1970-71 annual progress report. FL Game & Fresh Water Fish Comm., Tallahassee.

Brezonik, Patrick L., and Earl E. Shannon, 1971. Trophic state of lakes in north central Florida. Publ. No. 13, Water Resources Res. Ctr., U. of FL, Gainesville.

Dye, Craig W., 1977. Personal communication (Jetport treatment facilities; present status of waste disposal to Boggy Creek). FL Dept. of Env. Reg., Tallahassee.

Federico, Anthony C., and Patrick L. Brezonik, 1975. A survey of water quality in the Kissimmee - Okeechobee watershed. FL Dept. of Env. Reg. Techn. Ser. 1(8).

Shannon, Earl E., and Patrick L. Brezonik, 1972. Relationships between lake trophic state and nitrogen and phosphorus loading rates. Env. Sci. & Techn. 6(8): 719-725.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1201	ALLIGATOR LAKE	0.620	0.260	474.000	87.733	13.100	0.386
1202	LAKE APOPKA	0.102	0.230	484.176	46.611	8.200	0.019
1203	LAKE BANANA	0.660	0.260	482.667	208.600	3.600	0.293
1206	LAKE CRESCENT	0.065	0.130	473.889	10.211	10.200	0.033
1207	DOCTORS LAKE	0.084	0.120	465.555	27.100	10.600	0.028
1208	LAKE DORA	0.102	0.240	482.389	59.978	7.400	0.022
1209	LAKE EFFIE	1.480	0.410	489.000	261.433	15.000	0.950
1210	LAKE GEORGE	0.129	0.165	469.308	35.000	11.000	0.063
1211	LAKE GIBSON	0.167	0.115	470.000	19.675	10.200	0.069
1212	GLENADA LAKE	0.134	0.165	454.167	27.667	14.700	0.072
1214	LAKE GRIFFIN	0.119	0.260	481.333	66.855	6.600	0.038
1215	LAKE HAINES	0.063	0.115	462.667	26.567	10.600	0.014
1217	LAKE HANCOCK	0.772	0.195	483.500	97.900	5.600	0.158
1219	LAKE HORSESHOE	0.034	0.130	459.000	12.067	11.500	0.023
1220	LAKE HOWELL	1.260	0.285	464.000	54.117	9.000	1.175
1221	LAKE ISTOKPOGA	0.039	0.120	464.222	6.594	8.600	0.010
1223	LAKE JESSUP	0.492	0.290	487.000	76.550	7.600	0.288
1224	LAKE KISSIMMEE	0.034	0.145	463.667	24.142	8.800	0.007
1227	LAKE LULU	1.490	1.065	483.000	276.566	14.300	1.030
1228	LAKE MARION	0.044	0.260	468.833	29.967	7.600	0.016
1229	LAKE MINNEHAHA	0.038	0.080	435.000	8.733	7.700	0.012
1230	LAKE MINNEOLA	0.018	0.070	406.333	3.333	7.400	0.009
1231	LAKE MONROE	0.188	0.300	474.555	14.225	10.800	0.128
1232	LAKE OKEECHOBEE	0.063	0.185	472.366	14.524	9.800	0.010
1234	LAKE POINSETT	0.085	0.150	469.000	6.500	10.600	0.051
1236	LAKE REEDY	0.033	0.330	468.500	34.837	10.600	0.008
1238	LAKE SOUTH	0.074	0.130	464.000	23.167	9.000	0.028
1239	LAKE TALQUIN	0.085	0.290	462.167	9.483	14.400	0.031

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SOO-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1240	LAKE THONOTOSASSA	0.695	0.095	466.167	37.700	10.200	0.565
1241	LAKE TOHOPEKALIGA	0.246	0.200	472.917	30.633	10.500	0.152
1242	TROUT LAKE	1.110	0.650	472.003	76.967	12.900	0.970
1243	LAKE WEOHYAKAPKA	0.047	0.080	458.667	7.767	8.200	0.011
1246	LAKE YALE	0.027	0.160	441.000	25.367	7.600	0.014
1247	LAKE MUNSON	1.475	0.925	486.667	140.317	12.200	0.852
1248	LAKE SEMINOLE	0.234	0.175	473.833	102.000	8.600	0.026
1249	LAKE LAWNE	2.560	1.350	494.667	84.900	10.400	0.117
1250	LAKE TARPON	0.041	0.070	400.889	6.867	9.000	0.027
1252	LAKE ELOISE	0.486	0.170	465.333	70.233	12.200	0.339
1258	LAKE JESSIE	0.051	0.090	452.667	26.300	10.800	0.011
1261	EAST LAKE TOHOPEKALIGA	0.042	0.070	440.833	5.167	9.400	0.007
1264	PAYNE'S PRAIRIE LAKE (NO	1.260	0.140	476.000	88.200	7.400	1.210

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1201	ALLIGATOR LAKE	25 (10)	29 (10)	30 (12)	18 (7)	10 (4)	18 (7)	130
1202	LAKE APOPKA	50 (20)	38 (15)	10 (4)	38 (15)	74 (29)	70 (28)	280
1203	LAKE BANANA	23 (9)	29 (10)	20 (8)	5 (2)	100 (40)	23 (9)	230
1206	LAKE CRESCENT	65 (26)	70 (27)	33 (13)	80 (32)	48 (18)	50 (20)	346
1207	DOCTORS LAKE	60 (24)	76 (30)	60 (24)	55 (22)	34 (12)	56 (22)	341
1208	LAKE DORA	53 (21)	35 (14)	18 (7)	33 (13)	90 (35)	68 (27)	297
1209	LAKE EFFIE	5 (2)	10 (4)	3 (1)	3 (1)	0 (0)	10 (4)	31
1210	LAKE GEORGE	45 (18)	54 (21)	48 (19)	43 (17)	23 (9)	43 (17)	256
1211	LAKE GIBSON	40 (16)	81 (32)	45 (18)	70 (28)	48 (18)	40 (16)	324
1212	GLENADA LAKE	43 (17)	54 (21)	85 (34)	53 (21)	3 (1)	38 (15)	276
1214	LAKE GRIFFIN	48 (19)	29 (10)	23 (9)	30 (12)	95 (38)	48 (19)	273
1215	LAKE HAINES	70 (28)	81 (32)	75 (30)	58 (23)	34 (12)	78 (31)	396
1217	LAKE HANCOCK	18 (7)	43 (17)	13 (5)	13 (5)	98 (39)	28 (11)	213
1219	LAKE HORSESHOE	93 (37)	70 (27)	80 (32)	78 (31)	20 (8)	65 (26)	406
1220	LAKE HOWELL	11 (4)	23 (9)	69 (27)	35 (14)	60 (23)	3 (1)	201
1221	LAKE ISTOKPOGA	85 (34)	76 (30)	65 (26)	93 (37)	69 (27)	89 (35)	477
1222	LAKE JESSUP	28 (11)	18 (7)	5 (2)	25 (10)	83 (32)	25 (10)	184
1224	LAKE KISSIMMEE	90 (36)	63 (25)	73 (29)	65 (26)	65 (26)	99 (39)	455
1227	LAKE LULU	3 (1)	3 (1)	15 (6)	0 (0)	8 (3)	5 (2)	34
1228	LAKE MARION	78 (31)	29 (10)	53 (21)	50 (20)	83 (32)	73 (29)	366
1229	LAKE MINNEHAHA	88 (35)	91 (36)	95 (38)	85 (34)	78 (31)	80 (32)	517
1230	LAKE MINNEOLA	100 (40)	98 (38)	98 (39)	100 (40)	90 (35)	93 (37)	579
1231	LAKE MONROE	38 (15)	15 (6)	28 (11)	75 (30)	26 (10)	33 (13)	215
1232	LAKE OKEECHOBEE	68 (27)	45 (18)	40 (16)	73 (29)	53 (21)	89 (35)	368
1234	LAKE POINSETT	58 (23)	60 (24)	50 (20)	95 (38)	34 (12)	45 (18)	342
1236	LAKE REEDY	95 (38)	13 (5)	55 (22)	45 (18)	34 (12)	95 (38)	337
1238	LAKE SOUTH	63 (25)	70 (27)	69 (27)	68 (27)	60 (23)	56 (22)	386
1239	LAKE TALQUIN	55 (22)	20 (8)	78 (31)	83 (33)	5 (2)	53 (21)	294

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1240	LAKE THONOTOSASSA	20 (8)	85 (34)	58 (23)	40 (16)	48 (18)	15 (6)	266
1241	LAKE TOHOPEKALIGA	33 (13)	40 (16)	38 (15)	48 (19)	40 (16)	30 (12)	229
1242	TROUT LAKE	15 (6)	8 (3)	43 (17)	23 (9)	13 (5)	8 (3)	110
1243	LAKE WEOHYAKAPKA	75 (30)	91 (36)	83 (33)	88 (35)	74 (29)	84 (33)	495
1246	LAKE YALE	98 (39)	58 (23)	90 (36)	63 (25)	83 (32)	75 (30)	467
1247	LAKE MUNSON	8 (3)	5 (2)	8 (3)	8 (3)	16 (6)	13 (5)	58
1248	LAKE SEMINOLE	35 (14)	48 (19)	35 (14)	10 (4)	69 (27)	63 (25)	260
1249	LAKE LAWNE	0 (0)	0 (0)	0 (0)	20 (8)	43 (17)	35 (14)	98
1250	LAKE TARPON	83 (33)	98 (38)	100 (40)	90 (36)	60 (23)	60 (24)	491
1252	LAKE ELOISE	30 (12)	50 (20)	63 (25)	28 (11)	16 (6)	20 (8)	207
1258	LAKE JESSIE	73 (29)	88 (35)	88 (35)	60 (24)	26 (10)	84 (33)	419
1261	EAST LAKE TOHOPEKALIGA	30 (32)	98 (38)	93 (37)	98 (39)	55 (22)	99 (39)	523
1264	PAYNE'S PRAIRIE LAKE (NO	11 (4)	65 (26)	25 (10)	15 (6)	90 (35)	0 (0)	206

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1230	LAKE MINNEOLA	579
2	1261	EAST LAKE TOHOPEKALIGA	523
3	1229	LAKE MINNEHAHA	517
4	1243	LAKE WEOHYAKAPKA	495
5	1250	LAKE TARPON	491
6	1221	LAKE ISTOKPOGA	477
7	1246	LAKE YALE	467
8	1224	LAKE KISSIMMEE	455
9	1258	LAKE JESSIE	419
10	1219	LAKE HORSESHOE	406
11	1215	LAKE HAINES	396
12	1238	LAKE SOUTH	386
13	1232	LAKE OKEECHOBEE	368
14	1228	LAKE MARION	366
15	1206	LAKE CRESCENT	346
16	1234	LAKE POINSETT	342
17	1207	DOCTORS LAKE	341
18	1236	LAKE REEDY	337
19	1211	LAKE GIBSON	324
20	1208	LAKE DORA	297
21	1239	LAKE TALQUIN	294
22	1202	LAKE APOPKA	280
23	1212	GLENADA LAKE	276
24	1214	LAKE GRIFFIN	273
25	1240	LAKE THONOTOSASSA	266
26	1248	LAKE SEMINOLE	260
27	1210	LAKE GEORGE	256
28	1241	LAKE TOHOPEKALIGA	229

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1231	LAKE MONROE	215
30	1217	LAKE HANCOCK	213
31	1252	LAKE ELOISE	207
32	1264	PAYNE'S PRAIRIE LAKE IND	206
33	1220	LAKE HOWELL	201
34	1203	LAKE BANANA	200
35	1223	LAKE JESSUP	184
36	1201	ALLIGATOR LAKE	130
37	1242	TROUT LAKE	110
38	1249	LAKE LAWNE	98
39	1247	LAKE MUNSON	58
40	1227	LAKE LULU	34
41	1209	LAKE EFFIE	31

APPENDIX B

CONVERSIONS FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square Kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR FLORIDA 8/25/75

LAKE CODE 1261 EAST LAKE TOHOPEKALIGA

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 797.7

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1261A1	230.0	0.85	1.61	2.61	0.45	0.23	1.36	2.83	3.14	4.08	1.56	0.68	0.37	1.65
1261B1	13.4	0.08	0.09	0.14	0.08	0.04	0.07	0.11	0.13	0.20	0.22	0.16	0.09	0.12
1261C1	797.7	4.76	5.69	7.65	7.02	4.39	4.50	6.85	8.92	6.91	8.61	5.49	3.85	6.23
1261ZZ	505.0	2.78	3.17	4.84	2.80	1.47	2.49	3.77	4.56	7.02	7.56	5.75	3.23	4.12

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 797.7
SUM OF SUB-DRAINAGE AREAS = 748.5

TOTAL FLOW IN = 70.62
TOTAL FLOW OUT = 74.64

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1261A1	3	73	0.71	17	0.42				
	4	73	0.71	17	0.54	7	0.76		
	5	73	0.20	13	0.19				
	6	73	0.62	17	0.37				
	7	73	1.70	7	2.55				
	8	73	2.63	5	3.45				
	9	73	6.12	8	6.14				
	10	73	2.46						
	11	73	0.65	3	5.10				
	12	73	0.31	8	0.28	15	0.28		
	1	74	0.21	12	0.21				
	2	74	0.13	2	0.16				
1261B1	3	73	0.20	17	0.40				
	4	73	0.11	17	0.31				
	5	73	0.15	13	0.21				
	6	73	0.05	17	0.07				
	7	73	0.10	7	0.17				
	8	73	0.07	5	0.20				
	9	73	0.42	8	1.02				
	10	73	-0.05						
	11	73	0.01	3	0.31				
	12	73	0.01	8	0.25	15	0.08		
	1	74	-0.03	12	-0.01				
	2	74	0.02	2	0.01				

TRIBUTARY FLOW INFORMATION FOR FLORIDA 8/25/75

LAKE CODE 1261 EAST LAKE TOHOPEKALIGA

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1261C1	3	73	7.65	17	12.40				
	4	73	5.78	17	7.67	7	8.58		
	5	73	5.78	13	10.93				
	6	73	0.0	17	0.0				
	7	73	0.62	7	0.0				
	8	73	3.43	5	5.35				
	9	73	7.67	8	8.86				
	10	73	5.24						
	11	73	0.0	3	0.0				
	12	73	0.0	8	0.0	15	0.0		
	1	74	0.0	12	0.0				
	2	74	0.0	2	0.0				
1261Z2	3	73	0.68	17	-2.41				
	4	73	2.24	7	-3.60	17	13.56		
	5	73	0.23	13	2.66				
	6	73	-0.99	17	-2.15				
	7	73	-1.36	7	-3.43				
	8	73	4.22	5	1.50				
	9	73	4.76	8	-24.86				
	10	73	5.04						
	11	73	0.59	3	-5.75				
	12	73	0.06	8	-8.66	15	2.72		
	1	74	1.44	12	0.48				
	2	74	-0.54	2	-0.28				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/08/25

126101
28 19 49.0 081 15 16.0
EAST LAKE TOHOPEKALIGA
12097 FLORIDA

11EPALES
3

2111202
0009 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/13	09 25	0000	25.4		33	135	6.40	10K	0.080	1.400	0.060	0.007
	09 25	0005	25.1	6.2		130	6.80	10K	0.070	1.100	0.060	0.006
73/09/06	15 35	0000	29.4	6.4	31	116	6.00	16	0.060	1.600	0.060	0.013
73/11/07	08 20	0000	22.9		20	105	6.30	10K	0.070	2.000	0.050	0.012
	08 20	0005	22.8	7.0		105	6.30	10K	0.070	1.600	0.100	0.012

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/13	09 25	0000	0.029	4.1
	09 25	0005	0.033	
73/09/06	15 35	0000	0.039	6.9
73/11/07	08 20	0000	0.057	5.4
	08 20	0005	0.050	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/08/25

126102
28 18 08.0 081 16 31.0
EAST LAKE TOHOPEKALIGA
12097 FLORIDA

11EPALES
3

2111202
0015 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/13	10 00	0000	24.4		96	120	6.90	10K	0.040	0.500	0.030	0.004
	10 00	0005	24.3	8.2		120	6.70	10K	0.050	0.400	0.030	0.004
	10 00	0011	22.2	8.0		120	6.60	10K	0.040	0.500	0.020	0.004
73/09/06	15 15	0000	28.9	6.8	60	123	6.40	15	0.050	1.200	0.050	0.017
	15 15	0013	28.4	6.6		123	6.40	18	0.050	1.000	0.050	0.030
73/11/07	08 30	0000	22.7		44	113	6.60	10K	0.040	1.000	0.030	0.007
	08 30	0005	22.6	7.8		113	6.60	10K	0.030	0.900	0.020	0.007
	08 30	0011	22.6	7.8		114	6.70	10K	0.040	0.900	0.020	0.008

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/13	10 00	0000	0.016	4.4
	10 00	0005	0.016	
	10 00	0011	0.018	
73/09/06	15 15	0000	0.042	6.0
	15 15	0013	0.052	
73/11/07	08 30	0000	0.045	5.0
	08 30	0005	0.044	
	08 30	0011	0.045	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/08/25

126103
28 16 04.0 081 17 39.0
EAST LAKE TOHOPEKALIGA
12097 FLORIDA

HIEPALES
3

2111202
0012 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/13	10 45	0000	24.5		96	120	7.00	10K	0.050	0.500	0.030	0.003
	10 45	0004		8.3		120	7.00	10K	0.040	0.500	0.020	0.003
	10 45	0008	23.7	8.3		120	7.00	10K	0.040	0.400	0.030	0.003
73/09/06	14 45	0000	28.6	6.6	72	126	6.70	14	0.050	1.300	0.050	0.042
	14 45	0006	28.5	7.0		125	6.70	15	0.040	0.900	0.040	0.074
73/11/07	08 45	0000	23.1		38	116	6.70	10K	0.040	1.000	0.030	0.006
	08 45	0006	23.0	7.6		112	6.80	10K	0.040	0.900	0.020	0.008

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/13	10 45	0000	0.012	3.5
	10 45	0004	0.012	
	10 45	0008	0.015	
73/09/06	14 45	0000	0.076	7.1
	14 45	0006	0.081	
73/11/07	08 45	0000	0.042	5.9
	08 45	0006	0.047	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/08/25

126104
28 17 27.0 081 18 16.0
EAST LAKE TOHOPEKALIGA
12097 FLORIDA

11EPALES
3

2111202
0012 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/03/13	11	25 0000	23.6		96	120	7.40	10	0.040	0.500	0.030	0.003
	11	25 0004	23.6	8.6		120	7.40	10K	0.050	0.400	0.020	0.003
	11	25 0008	22.8	8.6		125	6.80	10K	0.040	0.500	0.030	0.004
73/09/06	15	00 0000	28.9	5.6	76	126	6.50	15	0.060	1.100	0.050	0.022
73/11/07	09	00 0000	22.3		48	114	6.70	10K	0.050	1.000	0.040	0.011
	09	00 0005	22.3	7.4		113	6.60	10K	0.040	0.900	0.030	0.009
	09	00 0010	22.3	7.4		115	6.60	10K	0.040	0.900	0.030	0.009

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/03/13	11	25 0000	0.026	3.2
	11	25 0004	0.025	
	11	25 0008	0.025	
73/09/06	15	00 0000	0.025	4.7
73/11/07	09	00 0000	0.047	5.8
	09	00 0005	0.047	
	09	00 0010	0.044	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/08/25

1261A1
28 21 00.0 081 19 00.0
BOGGY CREEK
12105 7.5 N ST CLOUD
T/E LAKE TOHOPEKALIGA
ST HWY 530 BRDG 1 MI SW OF LOCK HAVEN CH
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/03/17	09 00		0.050	3.500	0.260	0.350	0.380
73/04/07	11 45		0.032	1.500	0.069	0.270	0.300
73/05/13	11 10		0.024	0.740	0.044	0.350	0.400
73/06/17	09 30		0.040	2.200	0.150	0.440	0.470
73/07/07	12 20		0.023	0.917	0.044	0.280	0.360
73/08/05	10 45		0.013	1.200	0.046	0.273	0.330
73/11/03	11 15		0.084	1.100	0.096	0.216	0.220
	14 00		0.069	1.150	0.092	0.230	0.390
73/12/08	09 30		0.064	0.600	0.040	0.200	0.200
73/12/15	15 00		0.010K	0.300	0.036	0.152	0.195
74/01/12	11 45		0.192	0.700	0.020	0.224	0.270
74/02/02	13 45		0.028	0.600	0.040	0.250	0.290

STORET RETRIEVAL DATE 75/08/25

126181
28 16 00.0 081 16 00.0
UNNAMED CREEK
12 7.5 N ST CLOUD
T/E LAKE TOHOPEKALIGA
RD BRDG LEADING N FROM ST CLOUD
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/03/17	09 55		0.017	3.000	0.099	0.025	0.050
73/04/17	11 15		0.035	3.400	0.150	0.017	0.075
73/05/13	10 30		0.027	1.150	0.168	0.014	0.040
73/06/17	10 40		0.010K	1.050	0.014	0.018	0.052
73/07/07	13 00		0.010K	2.800	0.215	0.510	0.620
73/08/05	11 00		0.010K	0.840	0.042	0.019	0.030
73/09/08	12 55		0.010K	1.113	0.031	0.020	0.060
73/11/03	09 30		0.040	4.500	0.368	0.016	0.016
	14 45		0.011	1.400	0.080	0.030	0.160
73/12/08	10 30		0.016	0.800	0.040	0.012	0.165
73/12/15	14 10		0.010K	0.600	0.056	0.016	0.030
74/01/12	11 25		0.012	1.000	0.040	0.012	0.030
74/02/02	11 45		0.008	0.800	0.020	0.015	0.055

STORET RETRIEVAL DATE 75/08/25

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 1261C1
28 16 00.0 081 18 30.0
ST CLOUD CANAL
12       7.5 N ST CLOUD
U/E LAKE TOHOPEKALIGA
ST HWY 523 BRDG 1 MI NW OF ST CLOUD
11EPALES                    2111204
4                           0000 FEET  DEPTH
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DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/03/17	09	32	0.017	2.900	0.100	0.012	0.020
73/04/17	12	00	0.020	1.900	0.084	0.005K	0.025
73/05/13	10	45	0.022	0.600	0.014	0.010	0.020
73/06/17	11	05	0.010K	0.650	0.014	0.012	0.030
73/07/07	11	20	0.024	0.590	0.028	0.008	0.025
73/08/05	10	30	0.010K	0.635	0.021	0.015	0.032
73/09/08	12	45	0.010K	0.190	0.079	0.008	0.030
73/11/03	10	00	1.430	4.000	1.840	1.840	2.200
	14	30	0.010K	1.650	0.147	0.022	0.080
73/12/08	11	20	0.012	0.700	0.052	0.020	0.030
73/12/15	13	45	0.010K	1.000	0.040	0.132	0.180
74/01/12	11	15	0.010K	1.200	0.112	0.024	0.085
74/02/02	11	35	0.004	0.900	0.100	0.020	0.065

STORET RETRIEVAL DATE 75/09/25

1261AA TF1261AA P004000
29 27 00.0 080 19 30.0
MCCOY AFB
12105 1-250000 ORLANDO
T/EAST LAKE TOHOPEKALIGA
BOGGY CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/02/28	08	00							
CP(T)-			13.000	4.000	0.830	5.880	6.500	0.461	0.556
73/03/01	08	00							
73/03/27	00	00							
CP(T)-			12.000	2.900	0.480	6.150	6.700	0.475	0.610
73/03/28	24	00							
73/04/26	00	00							
CP(T)-			10.200	4.400	0.850	6.100	6.900	0.675	0.423
73/04/26	24	00							
73/05/20	24	00							
CP(T)-			8.200	0.780	0.390	6.200	6.775	0.512	0.592
73/05/21	24	00							
73/07/25	01	00							
CP(T)-			0.117	5.100	0.230	1.700	9.250	0.505	0.696
73/07/26	01	00							
73/08/29	00	00							
CP(T)-				3.900		4.040	4.800	1.000	0.525
73/08/29	24	00							
73/10/04	08	00							
CP(T)-			6.000	2.200	0.360	4.400	4.600	0.586	0.513
73/10/05	08	00							
73/10/29	01	00							
CP(T)-			5.300	2.300	0.450	5.600	5.900	0.497	0.462
73/10/30	01	00							
73/11/29	08	00							
CP(T)-			6.800	3.600	0.045	0.320	5.600	0.660	0.549
73/11/30	08	00							
73/12/28	06	00							
CP(T)-			10.600	3.200	0.850	5.100	5.600	0.413	0.350
73/12/28	24	00							
74/01/27	06	00	0.200	2.800	0.060	6.000	6.300	0.453	0.434
74/02/26	08	00							
CP(T)-			8.100	3.300	0.530	4.900	5.800	0.339	0.402
74/02/27	08	00							
74/03/22	08	00							
CP(T)-			7.560	1.000K	0.900	5.000	6.000	0.375	0.422
74/03/23	08	00							